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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Applicant:

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§ Group Art Unit: 1714§
§ Examiner: M. Medley

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Serial No.: 09/556,852

For: GASOLINE-OXYGENATE BLEND
AND METHOD OF PRODUCING
THE SAME§
§ Attorney Docket No.: 013129/00025

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DECLARATION OF CHARLES A. LIEDER, Ph.D., UNDER 37 C.F.R. 1.132

I Charles A. Lieder do hereby state:

1. I am over the age of 18;
2. I received a Ph.D. degree in Physical Chemistry from Stanford University in 1974. I further received a B.A. degree in Chemistry and Math from Hope College in 1970.
3. I have been employed by Shell Oil Company ("Shell") since 1974. My first position at Shell was as a Research Scientist in Reaction/Environmental Engineering. Since that time, I have served as a Supervisor for Process Development, Technical Manager in Process Engineering, an Operations Manager in Crude/Diesel/Hydrogen/Sulfur, a Senior Staff Engineer to Fuels Regulatory Technical Support and an Engineering Advisor in Gasoline/Fuels Blending Technology. From 1989 to 1990, I was an "Executive-on-Loan" to the California Energy Commission.
4. I am a co-inventor of the above-referenced patent application and am familiar with the claims as presently pending before the U.S. Patent and Trademark Office. All of the presently pending claims are directed to a blend of a gasoline and an oxygenate.
5. I have read and reviewed U.S. Patent No. 5,679,117 ("*Jarvis*").
6. *Jarvis* does not disclose a blend of a gasoline and an oxygenate. Rather, *Jarvis* discloses a reaction product of a high octane hydrocarbon material, prepared by subjecting a

mixture of ethanol and butane or natural gasoline to processing conditions in the presence of a platinum catalyst. The fact that *Jarvis* is directed to a reaction product, versus a blend, of natural gasoline and ethanol is evidenced by (i.) the recited reaction conditions (lines 25 of column 4 through line 3 of column 5); (ii.) the use of a platinum catalyst in "an elongated catalyzing chamber" (lines 25-27 of column 1); (iii.) characterization of the product of *Jarvis* as being derived from a "catalyzed mixture"; and (iv.) the disparity in the reported physical properties of the products of *Jarvis* and the theoretical physical properties of the products of *Jarvis*, assuming such products are a blend.

7. The Table in column 5 of *Jarvis* indicates that the amount of n-butane in the "final liquid product 60" is 53.03 vol. % and the amount of ethanol is 42.75 vol. %. If the "final liquid product 60" was a blend of 53.03 vol. % n-butane and 42.75 vol. % of ethanol, the minimum, theoretical RVP would be approximately 37. As such, in order for the "final liquid product 60" to have a RVP less than 7.1, the "final liquid product 60" would have to be a reaction product, not a blend.

My conclusions are premised on the following approximate theoretical RVP, assuming that (i.) the "final liquid product 60" is a blend and not a chemical reaction product and (ii.) the mole fraction of the liquid product is roughly equivalent to the volumetric fraction:

Component	Known RVP of Component	Approx. Mole Fraction	RVP x Approx. Mole Fraction
n-butane	54	0.53	28.62
Ethanol	18	0.43	7.74
Pentanes	20	0.04	0.80

Total: 37.16 = RVP of Mixture

There is a wide disparity between the (approximate) calculated RVP of the blend containing 0.53 fraction n-butane and 0.43 fraction ethanol and the RVP less than 7.1 claimed in the instant application.

Further the statement in lines 25-28 of column 5 of *Jarvis* that a high octane gasoline can be prepared by the addition of "20% by volume of the new product to 80 octane gasoline" to render a product having 92.8 octane and a "vapor pressure in the range of 4 to 19 pounds per square inch" is scientifically not possible unless the "new product" refers to a reaction product, versus a blend. The theoretical RVP of 20% by volume of "the new product" by itself would be 7.4 (0.20 x 37.16).

8. In lines 65-67 of column 5 of *Jarvis*, the patentees provide an example wherein the resulting product is "substantially one half natural gasoline and one half ethanol". The RVP of such a product, if it were a blend, would be greater than 7.1 PSI because the RVP of ethanol alone would be 9.0. The natural gasoline is described in lines 49-64 as containing 53.871% by liquid volume C6+, 3.03% by liquid volume butane, 0.697% liquid volume neo-pentane, 26.046% by liquid volume iso-pentane and 16.349% by liquid volume normal pentane. The (approximate) calculated RVP of the natural gasoline is as follows:

Component	Known RVP of Component	Approx. Mole Fraction	RVP x Approx. Mole Fraction
C6+	11	0.539	5.93
Butane	54	0.03	1.62
Neo-pentane	31	0.007	0.22
Iso-pentane	19	0.26	4.94
n-pentane	16	0.163	2.61

Total: 15.32psi = RVP of Mixture

The theoretical RVP for the product containing one half of such natural gasoline and one half of ethanol would therefore be 16.66 psi:

Component	Known RVP of Component	Approx. Mole Fraction	RVP x Approx. Mole Fraction
Gasoline	15.3	0.50	7.66
Ethanol	18	0.50	9.0

Total: 16.66psi = RVP of Mixture

Lines 65-67 of *Jarvis* indicate that the RVP for the resulting product would be between 1.5 and 8.0 psi. It would not be possible to have such a vapor pressure for the resulting product of 50% ethanol and 50% gasoline formulation unless the resulting product was a reaction product (versus a blend).

9. Lines 27-28 of column 6 of *Jarvis* states that the "final product has a vapor pressure in the range from 6 to 8 psi which is an acceptable range." For reasons discussed in paragraphs 7 and 8 above, the referenced "final product" can only refer to a reaction product, and not a blend. Substitution of pentane for butane and/or use of a "light gasoline" or "straight run gasoline having an octane rating in the vicinity of 65 to 70" (lines 17-19 of column 6) would support the conclusion expressed above, i.e., that the "final product" of *Jarvis* refers to a reaction product, not a blend of gasoline and an oxygenate.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and believe are believe to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

DATED: April 3, 2003

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